

FLORIDA HIGHWAYS



Road No. 1 Crossing Arm of Lake Jackson Just West of Tallahassee

Vol. IV

JANUARY, 1927

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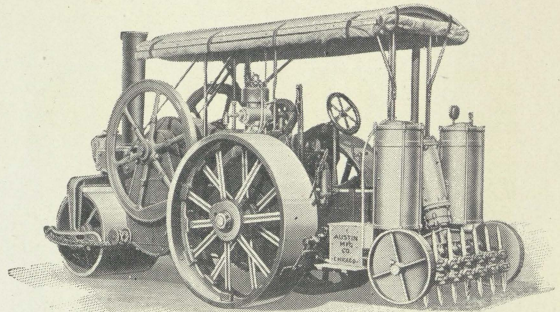
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Vol. IV

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No. I

Two Thousand Years of Road Building

By Thos. H. MacDonald, Chief, U. S. Bureau of Public Roads, Washington, D. C.
An Address Delivered Before the American Association State Highway Officials, in
Annual Session, Pinehurst, N. C., November, 1926.

One purpose of this paper is to provide a measure by which to form some adequate idea of the real and relative accomplishments of the highway building industry of this nation, and particularly of the membership of this Association, past and present.

Another, probably less possible, is to place before the public the longtime view of the problems of highway building and financing, lifting these, for the moment at least, above the many little passing objections and obstacles that hamper progress.

And yet, another, to bring to those engaged in this work a greater enthusiasm and determination, and a deeper confidence in going forward with the policies and the program we now consider the best practice.

A large undertaking to attempt within the limits of a few pages, perhaps, and admittedly so, but the highway engineers and officials must in justice to their work lift their eyes from the day's work to its compounded significance, to turn for the moment from the details of office and field to grasp intelligently just what has been going on in these United States when projected against the progress of the world after two thousand and more years of road building.

And so, too, for the whole highway industry, and even more truly for the general public, because of its control over public policies today in sharp contrast with the one-time power of single rulers so absolute

that they alone determined the dimensions of public work. Here is the first and one of the most vivid contrasts between the present and the past. There has been too much recitation of fact from history imposed upon us without intelligent interpretation. To cut away these foggy fictions to permit an understanding of the underlying truth will clear from our minds much rubbish and many inhibitions that have combined to lessen the degree of leadership this great public business demands and must have.

There have been just three great programs of highway building within recorded history that by the major tests of area served and mileage completed may be classed together:

That of the Roman Empire, beginning with Julius Caesar and extending to Constantine;

That of France under the Emperor Napoleon;

That of the United States during the past decade.

From the data it has been possible to examine it has not been possible to determine limiting dates with exactness from the Roman and French periods, nor is it necessary. There will not be entire agreement with the period assigned to the United States. It is hoped with more complete research to fix these periods more exactly, but the difference of a few years either way is not important. To understand the underlying reasons, principles and the results of these earlier great road building epochs is important. To gain from them their wealth of information bear-

ing upon civilization and reasoning by analogy to apply this knowledge wrought out of national experience to the projecting of the long-time curve of probabilities in the United States is most important.

THE ROMAN ROAD BUILDING PERIOD

The fact is recorded over and over, and public addresses have innumerable times reiterated that the Appian Way, the first of the great Roman roads, was commenced in the year 312 B. C. by the Censor, Appius Claudius, under the Republic, and extended from the Porta Capena, Rome, to Capua, about 125 miles distant. But we are confused by the assertion that the Via Aurelia, the second paved highway, was built about 242 B. C., or 70 years later. With the growth and extension of the dominion of Rome, road building progressed so that we read,* "The most ancient remarks we can find in the Roman history of the highways made in Italy to which several magistrates afterwards added so much, that in the days of Julius Caesar, the city of Rome was by them joined to all the regions and principal cities of Italy and though Augustus Caesar and the following emperors made extraordinary works there, it was rather to enlarge and repair them than to make new ones from beginning to end, excepting some made by Domitian, Aurelian and Trajan."

Julius Caesar extended the rule of Rome until there was included in the Western Empire the countries around the Mediterranean Sea, France, Belgium, Netherlands, Great Britain and parts of Germany, Austria and Hungary. At the height of his power, he was made Overseer of the Appian Way and expended large sums from his private purse to repair and extend this great highway. The rulers sent from Rome to administer the provinces carried on the work of road building. But a little later we read of Augustus,† "This great and fortunate Emperor finding himself in a settled peace with so many legions (estimated at 173,000 men) on his hands which might be debauched by sloth, thought he could not better employ so many men, dispersed throughout the provinces, than in the making of new highways in all parts of his Empire. . . ." In addition there were drafted for this work the common people, the mechanics and artisans, the criminals and condemned persons, so that,‡ "In short, we may conclude it was not one kingdom, or one region alone, that furnished men to work upon such a vast design, but that all Europe, Asia and Africa, set their hands to it. And that the greatest and most potent kingdoms that once flourished in said parts of the world were employed at it whilst they were subject to the Empire; which can not be said of any other work in the universe."

This work was carried forward sometimes in a desultory way and sometimes on a large scale under succeeding Emperors, but it reached its height under Augustus about 300 years after Appius Claudius began the Appian Way and in the decade before the birth of Christ.

THE NAPOLEONIC ROAD BUILDING

A brief word is necessary to bridge the Dark Ages (500 to 1150 A. D.) and the Middle Ages into the

eighteenth century. With the decay of the Roman empire the world road system as such broke down, although quite different conditions prevailed in different countries. Religious pilgrimages, the Crusades, the journeys of the secular rulers and the high dignitaries of the Church leave some record of the use of trans-State and transcontinental routes, but the records of commerce are meager. The general tendency was all toward feudal government which resulted in neglect and the actual tearing up of some of the ancient roads as a method of protection. Also, not only the roads but the magnificently built public and private buildings were wrecked to provide building materials. During this period ancient Rome was ravished to a much greater degree to provide building materials and metals than by conquest, fire or other causes.

Napoleon became first consul of France in 1799 and began at once to build a system of national roads. In 1804 through a plebiscite the people by an overwhelming vote decided he should become Emperor, and that year before the high altar of the Notre Dame Cathedral he placed a golden laurel wreath upon his own head. Also he crowned himself king at Milan of the monarchy of North Italy. Thus at the beginning of the nineteenth century, a large part of the same area that had been ruled by Rome, twelve and one-half centuries later was again brought under an Empire, this time that of France. The Corps des Ponts and Chaussees had been established in 1796, and was composed of trained engineers through the workings of the earlier established technical schools. So when the Emperor demanded and vigorously supported a big program of road building, large accomplishments were possible through the available organization. M. Prony, the director of the Ponts and Chaussees, described as an engineer of first rank, drove into execution this work. From 1804 to 1813, the expenditure for roads and bridges from the national treasury is placed at 300 million francs. On December 16, 1811, a decree was issued which established a uniform system of highway administration the general principles of which have remained unchanged. This decree divided the roads into imperial and departmental routes, and fixed financial responsibility upon the Federal Government and the Departments. It designated fourteen imperial roads of the first class leading from Paris to the principal cities of the frontier, 13 imperial roads of the second class from Paris to the less important cities on the frontier, and 202 roads of the third class joining interior cities, a total of about 17,000 miles. The departmental roads numbered 1,165, in all about 12,000 miles. These national routes included the Mont-Cenis, completed in 1805 to connect Paris with Turin, and the Simplon, completed in 1807 to connect Paris with Milan, Rome and Naples.

In an incomplete, imperfect way these facts present the only great road building programs that may be compared with that with which the United States is now engaged, but their aspects are very different than we have been led to believe. Both the Roman and the French systems have come down through history as military highways. On the contrary the greatest expenditures were made and the most extensive mileages built after the boundaries of both empires had been extended to their greatest dimen-

* Bergier, p. 35, History of Highways.

† Bergier, p. 42.

‡ Bergier, p. 47.



Project 562-B, On Road No. 8, Between Frostproof and Avon Park

sions. Certainly these roads were used for military movements, but both the Emperor Augustus and the Emperor Napoleon threw their energies into road building to make possible the administration of a great empire, to stimulate commerce and to provide food sufficient. Napoleon said, "he feared popular insurrections due to economic causes though he was not afraid of political risings." In other words, a transportation system, adequate and complete, is a fundamental requirement of a nation large in its physical dimensions. On this basis we must, in our conception, link our railroads and motor vehicles and highways. Together they supply the most adequate, most efficient transport system any like area in the world possesses or has ever known.

In the Empires, authority from a single source was supreme, in this Democracy we are dependent upon co-operation between the States themselves and between the States and the Federal Government to complete an orderly system of highways that will permit traffic and commerce to flow uninterrupted. In a major degree also we must depend upon co-operation, not legislation, to establish coordination between railway and highway.

More than 125 years ago France placed her highways under competent technical direction and provided for a system of technical instruction to train men. Generally speaking, the technical equipment of our highway engineers is very good and constantly improving. When fitness for the position and integrity of character are made the first requirements for appointment to highway departments, there will be no more highway administration scandals. Until

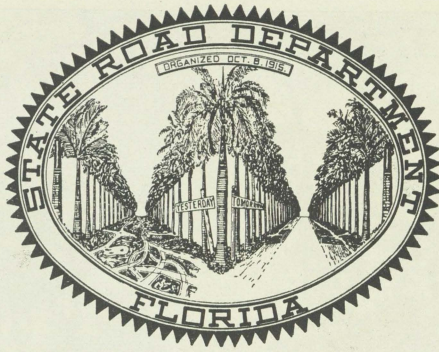
this is done we can hardly fail to have at least isolated cases of a breakdown of efficient and honest administration.

A GLANCE AT PRESENT DAY CONDITIONS

Of chief interest to us in the United States is the effect that past history has had upon present day road conditions since it may help us to see further ahead and certainly the experiences of civilization in the older countries ought to have much of value in formulating broad plans for the future.

Italy, with a relatively small nation in area, of about 120,000 square miles, has a population of 39,659,944. The population has clustered thickly along the world old lines of highways, has crowded in upon the rights of way, and there are many villages. There is a large amount of foot and animal drawn traffic, but the maximum flow of automobile traffic reported near the population centers is 3,300 vehicles in 15 hours. The Italian Premier, Benito Mussolini, in his final address to the Road Congress stated: "Italy has a great road problem to solve; new roads necessary to promote her agricultural life, to facilitate her commerce, and finally, arteries necessary for international tourism in order to render her beauties accessible. She possesses, moreover, a conspicuous road patrimony formed during many centuries by the work of countless generations." Apparently the surfacing and maintenance problems in Italy are of first import, but the new alignments that will be necessary, or perhaps even new rights of way, in many cases present, certainly, "a great road problem to solve." So serious is the problem of alignment

(Turn to page 17)



Florida Highways

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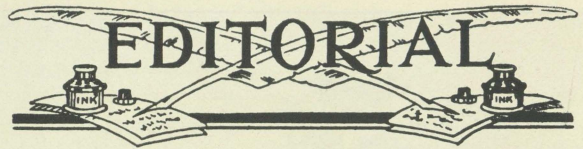
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Skirting Another Ocean

PROPOS of the description in our last month's issue of "Pacific Street," the "Longest Pavement in the World," Mr. Hamilton Wright has recently written interestingly of the counterpart of "Pacific Street" on the Atlantic instead of the Pacific seaboard. Included in this is the longest marine drive in the world under construction. It will tie together existing routes to make a drive unlike any other. When completed it will extend from Jacksonville in Northern Florida to the southern tip of Florida and thence across the Gulf of Mexico and the Florida keys to Key West a total distance of 522 miles.

It will throw open in a connected drive the greatest chain of ocean beaches suitable for motoring in the world, including the stretch of ocean beach between Jacksonville and St. Augustine, St. Augustine Beach and the world-famous Ormond-Daytona Beach, the world's largest natural speedway. It will include the daring Overseas Highway which will bridge the Gulf of Mexico and the palm-fringed isles between the southern end of Florida and Key West, a distance of 122 miles.

As a whole, the route will form the Florida end of the projected Atlantic Coast Highway from Maine to Florida. The Atlantic Coast Highway will follow the Atlantic Ocean practically all the way between our most Northern and Southern State, and it is interesting to record that through the efforts of the Atlantic Coast Highway Association, some bridging of streams has already been done in the Southern States.

The Florida end of the Atlantic Coast Highway, running South from Jacksonville, will be no exception. It will not only follow the ocean but for hundreds of miles will border it, a stone's throw from the waves. Hundreds of miles of this marine route in Florida, including existing roads, along the Atlantic Ocean and the colorful estuaries of the sea which follow the coast clear down past Miami, are already available as far south as Florida City in the southern end of the State where the Overseas Highway, the last link in the chain begins its leap across the ocean.—Kentucky Highways.

He Paid

A debtor seemed really anxious to settle a \$3.00 delinquent account. He had only \$2.00, a crisp, new two-dollar bill. He took it to a pawn-broker and pawned it for \$1.50. He sold the pawn ticket to a sympathetic friend for \$1.50. He then had in his jeans the much desired \$3.00 and settled the bill. Who lost, and how much?—Exchange.

Chairman's Column



Dr. Fons A. Hathaway
Chairman State Road Department

Florida and Florida's Roads

(An address broadcast by Dr. F. A. Hathaway, Chairman of the State Road Department of Florida, from the Chicago Daily News Radio Station WMAQ, Chicago, Illinois, January 11th, 1927, on the occasion of the meeting of the American Road Builders' Association.)

The American Road Builders' Association, now in session in Chicago, is the oldest and largest organization of its kind not only in the United States but in the world.

The attendance upon this meeting is estimated at

35,000, every hotel being filled to capacity. All of the States of the Union, with our Possessions, Canada, and Mexico, are represented.

It was organized for the promotion of highway building and it is in this annual meeting that the exchange of views and ideas takes place and where the results of experiments and investigations are made known and discussed.

Road building in America, as great as has been the progress thus far made, is still in its incipency, and there is much yet to be learned before we can

lay claim to having developed a positive scientific method of constructing permanent highways.

An interesting and important feature in connection with the Association is the exhibits of the many and varied types of road-building machinery and labor-saving devices. The improvement and evolution in this important field reflects to a very great degree the development in construction and progress made in our road building in the United States. The educational value of these exhibits cannot be overestimated. There are thousands of contractors from all over the country here in Chicago, highway commissioners, machinery manufacturers, dealers in road material, representatives of the Federal Bureau of Roads are here mingling together, touching elbows, and discussing the best, most modern, approved and economical methods of constructing highways and bridges.

Practically every phase of the subject of road construction will be discussed and by the ablest men of the country, before the session shall close, and the whole nation will be the beneficiary of the results that follow and the conclusions reached.

Another important feature of the Association, and the newest, and one of the most outstanding of the Convention are special exhibits by the American Association of State Highway Officials, Bureau of Public Roads, Highway Research of the United States, Alaska and Canada included, as well as several of the Pan-American countries; not the least of these State exhibits is that which Florida has installed.

Before closing I shall take the privilege of speaking a few words to you tonight on a subject naturally dear to my heart—Florida. This far southern state is known throughout America, if not the entire world, because it is for many reasons unique. Her winter climate is unexcelled, while her tempering ocean and gulf breezes make even the summer months delightful. This State has for many, many years attracted to her borders people from the frozen north who wish to avoid the rigors of the northern climate. The temperature of Jacksonville was 66 degrees when I left Saturday, January 8th.

Also, those who seek play and outdoor sports and recreation have been coming to Florida in increasing numbers to enjoy such opportunities as only Florida in these particulars has to offer. Those who enjoy fishing, hunting, water sports and bathing have also come to Florida in increasing numbers. Geographically, Florida lends itself to the nation and those seeking health and recreation because she is within twenty-four hours ride of from twenty to thirty millions of the nation's inhabitants. These are the things that the climate attracts, but Florida has more to offer. She has thousands of fertile acres of land capable of producing varied crops and in abundance. In the production of truck products the State possesses a gold mine; here strawberries, tomatoes, celery, cucumbers, potatoes, peppers, etc., bring annually to the grower millions of dollars. While in the central and northern sections of the State corn, cotton, melons, hay, poultry, are produced in great quantities. Her golden harvest reaped annually from her citrus industry is too well and generally known to mention. From this industry alone there flows into the State from fifty to sixty million dollars annually. It should also be noted that the State produces large quanti-

ties of tobacco for all purposes and there is also mined within the State, eighty per cent of the phosphate rock produced in this country. In naval stores she stands at the head, while in the production of yellow pine lumber and cypress, she occupies a position in the forefront. Florida's fish and oyster industry brings into the State from fifteen to twenty million dollars annually, possessing as she does a seacoast of greater length than the entire Atlantic seaboard north of her; while her fresh water lakes of which there are many thousands, and her streams, teem with fish of many varieties of the finest quality. It may be surprising to know that in manufacturing the State derives an income of two hundred million dollars, including naval stores, according to the last census.

The State's credit is sound, she being free from any bonded indebtedness whatsoever, and with more than ample funds in the treasury to carry on all the activities of the Government. Her railroads and steamboat lines are maintained to the highest degree of efficiency and are being constantly extended and expanded to meet the increasing demands of our rapidly increasing population. It has been stated upon authority that more trains enter and leave Jacksonville during the winter season than any other station in the country.

In the construction of modern highways, Florida has a record of proud achievement. There is probably no State in the Union whose road-building operations are attracting greater attention than those of Florida. She has drawn contractors from many States of the East and West, including Illinois, Pennsylvania, Minnesota and others. A careful and thorough system of trunk line roads has been mapped out and the State Road Department at this time has eighteen million dollars worth of construction work under way, with lettings monthly for new projects. The State occupies a place alone in her method of financing this enormous program. She is receiving annually fifteen millions of dollars from the automobile license tax, from the four-cent gasoline tax, three cents of which goes into the State Road Department treasury, and from the Federal Government. In other words, the State of Florida is building her highways on the Pay-as-you-go plan, and has not issued one dollar in State bonds for roads. Already such progress has been made in the building of Florida's roads that the motorist can enter the State from a half dozen or more points from the north and northwest and reach the important cities and towns on both her coasts without once leaving modern improved highways. Her system of roads has been laid out so that Florida connects up with all important trunk lines and national highways touching her borders, making continuous ideal motor tours. Once in Florida, the tourist and visitor may ride with comfort and ease to any part of the State, and enjoy our tropical scenery and the health-giving properties that the Florida climate alone can afford. Florida's progress has been phenomenal. Her future is assured. In the things that are peculiarly hers, FLORIDA HAS NO COMPETITOR. Her population is cosmopolitan. Into Florida have come people from every State in the American Union and from abroad. From the north, east, west and south many of the best of other States have cast their lot with the native population and, working together, have given Florida high rank commercially, agriculturally, horticulturally, and



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have made her the playground and health resort of the nation. She welcomes within her gates peoples from everywhere, whether in search of recreation, superb climate, renewed health, investments, or to engage in business activities. Indeed, Florida was not given to America for the enjoyment of a few, but was created for, and belongs to, THE NATION.

Reference has been made to Florida's exhibit at the Coliseum. This is in charge of one of our highway engineers who is busily engaged in showing visitors through, answering questions and giving out literature descriptive of the State and her road system. Among the publications being handed out is our official magazine, "Florida Highways"; this is a pictorial souvenir edition, carrying many pictures of roads and bridges and some interesting tabulations of information. As long as the supply at Tallahassee lasts, the Department will be glad to mail a copy of this attractive magazine to those who are listening in to-night, and also one of our road maps.

LESS POWER REQUIRED

Tests by the Bureau of Public Roads show that from three to four times as much power is needed to draw a farm wagon over an unimproved road on heavy soil as is needed to pull the same wagon on a compact gravel road. On well-maintained earth roads, the bureau found that the tractive resistance of solid-tired motor trucks moving at 10 miles an hour was 55 pounds to the ton; on a well-maintained gravel road it was 45 pounds per ton and on

good paved roads it was 35 pounds per ton. Translated into common language, that means that the pull of the road surface itself against the motor—the resistance of the surface to the forward movement of the vehicle—is more than half again as much on a good dirt road as on a paved road.

In other words, facts and figures have repeatedly demonstrated to the satisfaction of the average citizens that improved highways pay actual dividends to those who use them. The farmer, for instance, is enabled to make more rapid delivery of his products and the number of possible trips in a day are increased tenfold, provided the distance is not unreasonable. Before the coming of improved highways only those who lived within a few miles of a railroad station dared to grow fruits and produce for shipment to distant points, because of the delay in reaching the shipping point. Today truck farmers for miles around have no difficulty in reaching the shipping points in a comparatively short time, and are enabled to dispose of their surplus products to advantage.

However, it does not require argument to convince the most skeptical that improved highways lessen the hardships and increase the pleasures and benefits of residing in the country, thus making for a more contented and prosperous citizenship.

Yesterday we heard positively the last one on our friend, the absent-minded professor. He slammed his wife and kissed the door.—Denison Flamingo.

Highway Expenditures Must Be Doubled to Meet Increasing Transportation Needs of the Country

By Howard L. Clarke, in Manufacturer's Record

BEFORE we can make money in business we must spend money for plant facilities. When these plant facilities become inadequate to meet the increasing demands upon them we must pay more money for improvements and additions, in order that continued operation may show a profit and greater savings be obtained. Therefore, we have the paradox of spending money in order to save money. Industry and transportation are meeting this situation.

In railroad transportation alone it is estimated that \$1,000,000,000 a year for the next 10 years will be necessary to supply facilities to take care of the growing demands of traffic. Likewise in our waterways systems, which recent discussions have shown are now beginning to earn a substantial dividend and savings to the American people on the \$1,250,000,000 expended for their improvement, the National Government is spending for river and harbor improvements over \$60,000,000 a year and millions more will be needed before we are to secure the greatest advantage of our water routes.

The same situation today faces the highways of the country, only in a more pronounced form. In proportion as the railroads of the country are more numerous and reach more people than waterway facilities, so the country's highways are in greater numbers and offer a more universal service to the public than any other form of transportation. Our country in the rate of progress it is making and that it may not be hampered in its normal growth, must utilize every effort to see that transportation facilities, whether rail, highways, waterways or airways, are keeping pace with the country's transportation requirements. Highways are vital factors as feeders to railroads and inland waterway carriers and, with the fuller use of the motorbus and motor-truck, are themselves becoming a great artery through which the life-blood of the nation's commerce is carried.

Government figures show that there are 3,001,825 miles of roads in the United States. Of this total

mileage 275,658 miles, or less than 10 per cent, have been improved to the degree of grading and drainage, and under bad weather conditions many of these roads prove a delusion and a snare to the motorist; 521,915 miles, or less than 18 per cent of all roads, are surfaced, and but 75,388 miles, or 14 per cent of surfaced roads, or 2.5 per cent of all the roads in the country, are bituminous, asphalt, concrete or brick. Over \$1,288,000,000 was spent in 1925 on all roads of the country, and the amount will be even greater

for 1926. In 1914 the United States expended or invested \$240,264,000 for highways. The United States is now investing annually about four and a half times similar expenditures of 11 years ago. During this period the number of motor vehicles have increased from 2,000,000 to 20,000,000, or ten times. Preliminary figures compiled by the National Automobile Chamber of Commerce indicate that there are now 22,000,000 motor vehicles in the United States. We are now making in one year more than double the motor vehicles in the country in 1914. In fact, highway expenditures in the Southern States, amounting to approximately \$400,000,000 annually, are now \$150,000,000 in excess of what the coun-

TOTAL ROAD MILEAGE AND HIGHWAYS IMPROVED AT END OF 1925.

(Includes Existing Roads in County, Local Rural Roads and State Highway Systems).

STATES	Grand Total Mileage All Roads U.S.	Mileage Improved Roads		
		Earth to Established Grade and Drained.	All Sand, Clay, Gravel and Hard-Surfaced Types.	Bituminous Asphalt, Concrete and Brick.
Alabama	61,541	7,585	13,560	345
Arkansas	74,865	1,901	6,499	804
Florida	30,263	3,144	9,844	2,470
Georgia	97,892	24,144	18,710	1,254
Kentucky	68,704	761	17,231	521
Louisiana	39,803	....	5,183	73
Maryland	14,868	1,579	4,689	1,111
Mississippi	56,108	1,264	9,910	470
Missouri	110,500	12,264	10,658	1,428
North Carolina	68,148	15,021	20,017	2,456
Oklahoma	134,262	3,605	1,686	571
South Carolina	64,634	6,582	10,061	346
Tennessee	65,322	9,791	13,325	1,146
Texas	167,685	2,985	20,115	1,440
Virginia	59,080	4,434	9,782	1,007
West Virginia	35,243	1,159	1,628	1,094
Total South	1,148,918	96,219	172,898	16,536
South's Percentage ..	38.2	34.9	33.1	21.9
United States	3,011,825	275,658	521,914	75,388

try spent in 1914, while the motor vehicles registered in this section alone in 1925, numbering 5,153,000, are over 3,000,000 more than were in the United States in 1914.

No one can say that there is no need for more highways or improvements in widening existing roads. Such an assertion would mean a belief that the United States has reached its ultimate development. In the more thickly populated sections of the country the roads built only a few years ago are found to be inadequate to handle the present-day motor traffic. Instead of one narrow road it will not be many years before there will be constructed roads double the width of those at present, which are hampering the free movement of traffic, and probably in the more congested areas a separate trunk-line highway for slow, heavy truck traffic and another paralleling it for fast motorbus and auto-

mobile passenger traffic. Then, too, the expenditures for road repairs and upkeep, if we expect to maintain what has been invested, must be greatly increased in order that our highways may continue to give the most profitable transportation service. In practically every State highway expenditures could be doubled and still be far behind actual needs to insure adequate facilities for motor traffic in the next few years.

In the beginning much of the mileage was a one-track road, and in isolated sections in thinly populated States this condition still exists; a little later roads of 14 feet and then 16 to 18 feet wide were exceptional, but in Illinois 20 feet is now the minimum width, with 40 feet at intersections.

Let us not lose sight of the fact that in this vast expenditure on road building every dollar for construction and maintenance cost is an investment paying substantial dividends in savings to the American people. Every mud or sand road eliminated, every hill cut to grade, every crooked road straightened, every crowded highway which is being widened to enable motor traffic to move more freely and thus save time between given points, adds to the savings of our hauling costs and increases the efficiency of American business. The time saved and reduction of wear and tear on motor vehicles represent in dollars and cents an amount which would more than cover the cost of these improvements. In addition there is an added investment created by the building of improved highways to the adjacent property values of all sections through which such roads

pass. This amount alone is probably in excess of the nation's highway expenditures. The building of good roads and the automobile made possible our great suburban developments, which have added billions to the nation's material wealth and been of untold value from the health standpoint.

Another source of wealth creation, for which the automobile and good highways are responsible, comes from the improvement in the diversification of crops in the farming sections where roads have become improved and made passable throughout the year. This means that the farms are more valuable, because their earning power is greater, and it also means that the community or city consumers are benefited by the farmer being able to bring his products to them, increasing the price the farmer receives and reducing the cost to the consumer.

Traffic surveys indicate that in general the roads being built today are inadequate to care for the demands made on them by the constantly increasing number of passenger cars, trucks and motor-buses. A motor trip over any of the hard-surfaced roads of the main highways routes proves the congested conditions existing, retarding the free movement of highway traffic and endangering lives and property.

Twelve States of the 48 have approximately 300 miles each of hard-surfaced roads, and many of these States are seeing their proper development retarded and are thus penalizing millions of people, because income is cut down and the wealth of the nation reduced in proportion.



Project 562-B, in Highlands County, Between Frostproof and Avon Park. Road No. 8

One State highway authority believes that if we do not begin shortly to relocate some of our present-day highways built years ago, principally for horse-drawn traffic, and remove some of the safety devices we are now using and make the highways really safe without their use, we will find ourselves in the same position that the cities and towns are finding themselves in with regard to the parking situation. Traffic must be speeded up, and the only way to insure some degree of safety is to rebuild many existing roads and make the new ones wider and of heavier construction.

At our present rate of road building it has been said that between 3,000,000 and 4,000,000 carloads of material are going into new highways each year. At the new rate, if the materials can be supplied, the total probably will run to 10,000,000 carloads a year, and that, if shipped all at once, would crowd every other item of freight off the railroads for a period of nearly ten weeks every year. This illustrates the magnitude of the work before us in supplying the material, to say nothing of the additional equipment that will be required.

In 10 years the number of automobiles has increased from 2,500,000 to over 22,000,000. Motor-trucks are today more numerous than all motor vehicles were in 1915.

The number of surfaced roads is about twice as great as it was 10 years ago. During this period it has been necessary to reconstruct and widen a large part of the mileage previously constructed.

There are being built by county and local authorities and State highway departments, in conjunction with Federal-aid, about 9,000 miles of bituminous, concrete, asphalt and brick highways. There are being turned out by the nation's automobile factories about 4,500,000 cars and trucks a year. If these new cars were all placed in double file on the hard-surfaced roads completed last year, they would be spaced scarcely five feet apart. The sum of \$1,300,000,000, which is spent a year on highways, will not suffice. We must begin to make immediately greatly increased expenditures, running as high as 300 per cent in some sections, if hopeless congestion is to be avoided in the not distant future. Our highway expenditures will at least have to be doubled in the next five years or we will lose almost as much, because it will be impossible for traffic to move freely and efficiently.

The Charleston Gazette recently stated that "a people can be excused for failing to catch the true vision of the aeroplane. That has not reached the point where it can be said to be practical, except for a limited passenger service and light freight. But the motor car and trucks are now competing with railroad traffic, and anyone ought to see that any city which is on hard roads, that are part of interstate systems, is very shortsighted in failing to put the same store upon that fact as has heretofore attended the building of new railroads into such cities."

As railroad transportation increased, the light railway construction and bridges were rebuilt, and then as heavier and heavier rolling stock was re-

AREN'T WE CHILDREN A LITTLE SPOILED?

To those who remember the time when \$40 an acre was considered an outrageous price for land, a spring seat on a farm wagon a luxury, and the possessor of a "top buggy" a nabob; when there was scarcely a furnace or a bath tub in the entire county; when the only refrigerators in town were those in the butcher shop; this age when one only has to touch a button to get light with the strength of a hundred candles; when you turn one faucet and get cold water and turn another and get that which is hot; when houses without bathrooms and furnaces are exceptions; when schoolhouses in small towns are better appointed than State Capitols used to be; and country children are taken to and from school in auto busses, and city schoolhouses are not considered quite up-to-date unless equipped with a swimming pool; when workmen drive to their daily tasks in gas cars; and there are enough autos to take every man, woman, and child in the state out for a joy ride at the same time, it seems as though some genii had rubbed a modern Aladdin's lamp and that we are living in Fairyland.

The truth is that these things handed to the young people of today are the results of toil and thrift—the subjugation of a wilderness—by men and women who asked only a chance to try their strength, and to the triumphs of science and the discovery of truth. To this pampered generation these facts, the toil, the sacrifice, the hardships and privations are unknown. The rich heritage is accepted as a matter of course—often without so much as a thank you, and frequently with complaint because there is not more.—Kentucky Highways.

quired and traffic increased, the double tracking and still better railway facilities were added. And that is the evolution which highways and motor vehicles are undergoing. First, the building of good roads. Then the present stretch of modern highway construction, with better bridges and better automotive equipment, and later followed by the widening of highways. We are rapidly coming to the time when double tracking of our highway systems will be imperative to handle the motor-vehicle traffic.

Secretary W. M. Jardine of the Department of Agriculture, under which the Bureau of Public Roads operates, recently stated that in contemplating the future he was impressed with the necessity for making adequate provision for the increasing service expenditures of the highways. Great as has been the increase in motor vehicles in the past 10 years, there is no reason to believe that the increase will be abruptly halted, although some falling off in the rate of increase may be expected. Highway service must be capable of expansion to meet the needs of growing traffic, and we can only increase our highway service by spending more money in the building, widening and improving of our roads, which with the motor vehicle, are becoming the country's greatest transportation medium.

Build More and Greater Highways



WITH over 22,000,000 automobiles and motortrucks operating in this country, representing an annual expenditure for purchase and maintenance of over \$15,000,000,000, and with the certainty that automobile traffic and motorbus transportation will continue to increase to an indefinite extent, the need of more and broader and more substantial highways is becoming every day more apparent.

Highways built five or ten years ago are in many cases wholly inadequate to the needs of the present. Few people then realized the number of automobiles for pleasure and for business that would be in use by this time, and probably none realized how many motorbuses and motortrucks would be running at high speed and carrying heavy loads.

None but the most substantial highways can possibly stand the pounding of these enormous motortrucks and motorbuses at the present time, and their use is expanding with remarkable rapidity. New motorbus lines are being established almost daily. Motortrucks are carrying more and more freight on long hauls as well as on short ones.

At the same time the railroads are crowded to the limit of their capacity with existing facilities, and it will take all the ingenuity and all the capital that can be secured by railroad managers to increase railroad facilities to a sufficient extent to handle the growing railroad traffic of the country. Without the motorbus, the motortruck and the automobile the railroads would be hopelessly swamped, broken down physically, and that would soon mean broken down financially.

However great the cost may be of building improved highways, wide enough to meet increasing traffic, solid enough to stand the wear and tear of heavy trucks and buses, this country must go ahead with the work on a larger scale than we have yet had. Instead of \$1,000,000,000 a year being spent for highway construction, the amount must be doubled, and that right soon. If we can spend more than \$15,000,000,000 a year to purchase and maintain automobiles and motortrucks, we can certainly spend \$2,000,000,000 a year to provide the highways over which they are to run.

Here and there is to be found an engineer broad enough in his views to realize the supreme necessity of more highways, broader highways, firmer highways and special highways constructed between important cities for high-speed automobiles and motorbuses and motortrucks. The people at large, however, do not seem to have fully realized this. Many of the accidents are due to overcrowding of the present highways. In 1925 deaths from accidents in which motor vehicles were involved reached the appalling total of 26,627. The cost in life is too great. This frightful toll must be lessened.

Public officials who fail to recognize the importance of this situation and, therefore, do not press with sufficient eagerness for the building of new highways, will to some moral extent at least be responsible for many of the deaths and accidents which now occur on overcrowded highways.

—Manufacturers Record.

Some Requirements of the Highways of the Future

"Super-automobile highways built through private enterprise are inevitable," says Walter Parker of Fenner & Beane, New Orleans financial house, and formerly manager of the Association of Commerce, New Orleans. "Highway construction is imposing a monster burden on the taxpayers for a system which, long before its completion, is known to provide inadequate facilities. Automobile owners do not object to the cost of good machinery, good roads and good service. That fact has made possible the rapid development of the automobile industry and the speed shown in highway construction. But the new generation will require far more in highway building than is provided for in present programs or capable of being paid for out of present-day tax revenues. The American people now pay in Federal, State and local taxes some \$11,500,000,000 annually. They are demanding reductions, not increases, in taxes."

Mr. Parker predicts that "automobile owners will soon be demanding wide, protected concrete speedways connecting the great centers. They will desire grade crossings wholly eliminated. Even if super-highways of this character are to cost no more than \$50,000 a mile, the addition of such a cost to the cost of normal highway construction and the carrying out of existing highway plans would bankrupt the tax collector and the public treasury.

"But super-highways of this character would be a good investment from the viewpoint of the automobile owner. They would save him time and real money on tires, wear and tear and on repair bills. Such roads would double the tire mileage and the life of the car. No automobile owner would hesitate to pay, say, 1 cent a mile for the privilege of using such a highway in preference to using free publicly built highways of less comfort and convenience. The contrast would equal that of a Pullman car and a day coach."

That the time has arrived when private enterprise may well begin to think of the investment opportunity presented by the need for super-highways is the belief of Mr. Parker. Assuming that such a highway could be built for \$50,000 a mile, 100 miles would involve the expenditure of \$5,000,000, he states, and a toll of 1 cent a mile would produce an annual revenue of \$1,825,000 with 2,500 vehicles using such a road each way each day.

It is suggested that in this manner business enterprise might well enter the field of highway building so as to relieve congestion through offering to motor-vehicle owners a better and more economical service than the free public highways offer.

The production in the future of a very low-cost type of motor-car and the liquefaction of coal and lignite in the form of a low-cost motor fuel are foreseen by Mr. Parker, and these developments will, he thinks, hasten the need for the construction of super-highways of a de luxe character.

While the idea of building super-highways by private enterprise is not altogether new, the New York Times points out in a recent editorial that it has not been much discussed in recent years owing to the prevalent hope that the Federal and local governments would be able to improve existing roads and build new ones to meet the nation's needs. "But

that the use of the roads is and will continue to be far in excess of the rate of building and repair now seems established," says the Times. "Aside from the constant increase in private cars and trucks, the bus system promises to grow so fast as to add to the congestion and to increase the wear and tear. Each new invention which cheapens the cost of motoring will increase the strain on the nation's roads. To meet this will require ever-growing sums of money, which will have to come out of the taxpayers in some form or other."

Already the building of special motor-vehicle roads, generally toll roads, has received particular attention in Italy. The Engineering News-Record states that in Italian practice the *autostrada*, or special motor-vehicle road, is a paved highway on a separate right-of-way fenced and guarded at entrances, without intersections and crossings at grade, designed and reserved for motor vehicle—truck or automobile—traffic solely. It is described as an independent road, separate and distinct from existing highways between the same termini, designed and built for uninterrupted speed.

"Voluminous conclusions broadly in favor of such roads were adopted recently at the International Road Congress at Milan, with, however, the delegates from Great Britain and the United States declining to vote on the basis that the experience and service records are lacking for 'definite conclusions capable of general application,'" says the Engineering News-Record. "The conclusions are most interesting, perhaps, for the indication they furnish of the liberal views which European highway authorities express regarding the financing of special roads. It is held that they may be financed from the State's general balance, by a general motor tax, by general taxes (tolls) on users, by local bonds or subsidies or by any combination of these which may be for the public weal. Tariffs for tolls, it is considered, should be regulated by public authority. In regard to the justice and expediency of the toll-road principle the conclusion is that 'it is quite fair and rational that a special tax should be levied upon those who willingly make use of a speedier and more convenient means of transport over certain distances, while they are still free as any other motorist to choose between the *autostrada* and the ordinary road.' As the problem of the high-speed trunk road, perhaps the toll road, is directly before us in America, these conclusions of European engineers are of particular interest."

The increasing congestion on the highways of the country will force many innovations in highway engineering, in the belief of W. C. Markham, executive secretary of the American Association of State Highway Officials. Among these innovations will be cross-overs and cross-unders at intersecting points on all important highways and boulevards. Wide roadways, well lighted at night by electricity, or possibly by some method yet to be applied, such as a radioactive substance, will, if present trends continue, be policed through their lengths by "stop" and "go" lights. Indications are that on main highways instead of speed limits of 35 miles an hour motorists will be required to maintain some minimum figure, say 25 miles per hour, and failing to do this,



Project 605, Road No. 8, Between Haines City and Frostproof

may be arrested for obstructing traffic. There is a possibility of pedestrians who risk their lives and the peace of mind of drivers by crossing opposing traffic being arrested for interfering with the movement of traffic. In congested areas Mr. Markham believes that separate traffic lanes will be provided for pedestrians and vehicles.

These predictions are even now being fulfilled in part. In Pennsylvania and Indiana the Lincoln Highway is being widened to 36 feet. Four lane pavements with each 20-foot strip kept within its bound, preventing cutting-in either from opposing or accompanying traffic, are already being built in Illinois and Wisconsin. In Chicago an underground escalator will carry the pedestrian across the street, where now he is forced to pass through fourteen lines of automobiles. Pico boulevard, in the Southwest, has been widened to 75 feet, and the Cahuenga Pass road out of Los Angeles is being widened to 72 feet. Around Detroit 88-foot roads are being constructed on a right of way 204 feet wide. There are two separated roadways, 44 feet wide, for one-way traffic. On each of the four-track roadways, horse-drawn vehicles keep to the right, slow-moving trucks outside them and automobiles in the other two lanes. Thus rapid, safe and easy movement is provided for all types of traffic. Space is provided between the roadways for trolley lines, and there is also space for parking and for pedestrians. Chicago has just completed a double-deck boulevard at a cost of \$22,000,000, known as Wacker Drive. It is eight blocks long and is expected to reduce present traffic congestion in the "loop district" 43 per cent. Automobile

traffic on the upper level is wholly separated from the trucking on the lower level. Even before its completion new values in surrounding property of between \$200,000,000 and \$300,000,000 had been created. An elevated "express highway" is the answer the Borough of Manhattan and the State of New Jersey are making to the big traffic problem that will come next spring with the opening of the Holland Vehicular Tunnel, and traffic engineers say it is a forerunner of wholesome revolution in city motor highways as a whole. The Manhattan boulevard will cost \$13,000,000 and the New Jersey highway \$40,000,000.

To make highways safe and to speed up traffic it is predicted that separate roads will be built for freight and for passenger service—a heavy-type construction for the first and a lighter type for the second. To promote safety at the intersection of important roads, highway grade separations are now being built in the West, the design providing for two levels—through traffic proceeds on an overhead bridge and turning traffic swings wide of the bridge down to the level of the highway crossing at right angles beneath.

Thus throughout the country a digest of expert opinion shows the overwhelming conviction is upon traffic officials that automobile production will continue at high levels and the only way out is to find room for more cars and to handle traffic more efficiently.—Manufacturers Record.

Highway Building on a Larger Scale Is One of the Supreme Needs of the Country

When the internal combustion engine came into being it marked a new epoch in human affairs. It revolutionized our means of transportation by land, by water and by the air. In all of this the change has been so rapid that we have hardly adjusted ourselves to the full realization of what it means in human activities.

The internal combustion engine brought into being the automobile, the motortruck, the motorbus, the motorboat, the motorship, the airplane. All that has thus far been accomplished through the utilization of this new power is, we believe, small as compared with the progress of the coming years. Daring, indeed, must be the vision of a man who ventures to look into the future and attempts to draw aside the curtain which veils the future from our knowledge and tries to set forth some of the things he can thus visualize. We can, however, conjecture and draw a little upon our imagination based on what has already been done.

The automobile, once a toy, a plaything for the rich man, has become a prime factor in all the ramifications of life throughout the country. It has changed the face of the earth. It has changed all business methods. It has well-nigh wiped out distance. It has made suburban development on a large scale a possibility, and in so doing has created vast wealth and stopped the trend toward congestion of population and business in limited areas. It is helping to decentralize business to the good of the country. It has given longer life and greater health to millions of people. It has taught them to love nature. To a large extent it has taken the place of the saloon, and men now drive their families into the country and on picnics, where formerly they wasted their money in riotous living in corner saloons.

It has made us a nation of mechanics. It has taught the farmer boy, the educated white man, the uneducated negro, something of mechanics, and it has stimulated in them a desire to know more of electricity and of machinery, and in this respect the automobile becomes in reality technical schools for broadening the knowledge of tens of millions of people about machinery and how to utilize power.

Back of all material advancement; indeed, it might be said, in these days back of all the advancement in education and in science, in the maintenance of religious activities made possible by prosperity, is power. The cheaper the power that can be utilized, the greater is the advancement of the country. The more abundant the power available on the farm and in the factory, and for all the business and pleasure activities of a nation, the greater will be the country's material advancement.

Power is the Creator of Wealth.

He who lessens the cost of power and gives to it a wider distribution is a benefactor of mankind. Whether consciously or unconsciously, he is hastening the day for more widespread prosperity and for the uplifting of millions of people who, without the use of power, would have continued through the coming generations and centuries to be denied the blessings which are now so common to us.

Prior to the coming of the automobile this country was sinking lower and lower in its highway work. Mud roads, impassable in winter and early spring, and bottomless sand roads in some sections, were all uniting to lessen the religious and educational activities of the country. In vain were country churches built and country schools established where impassable roads made church and school attendance almost an impossibility. Millions of children were growing up with but little religious and few educational advantages. In the early days of motoring a foreign ambassador undertook to drive from Washington to Baltimore, a distance of 40 miles, and made the journey in five hours' time over a highway that was a disgrace to civilization. But that highway was merely typical of nearly all the so-called highways of the land.

We have commenced to build highways. The convention shortly to be held in Chicago of the road builders of the country will bring together thousands of men who are among the great constructive forces of the country. There will be road engineers who have visioned what good roads mean. There will be contractors who are doing the work of highway building. There will be inventors and machinery manufacturers in attendance, all united in the purpose of seeking to give to this country a greater highway system than has yet even been projected.

As they study the problems connected with this question they will come more and more to realize that highway building in America has only started. We have been doing pioneering work only. We have put down a few miles here and there as compared with the hundreds of thousands of miles of road that must be built. We have built narrow roads. We have built roads that are without the strength and foundation needed for the traffic which is developing. We have seen many roads destroyed because they could not stand the heavy traffic of motorbus and motortruck. We have seen roads built by inexperienced engineering and inadequate contracting work. What has been done is largely of an experimental character. What must now be done will be as much greater than what is being done as what is being done is greater than the "do nothing" policy of 30 or 40 years ago.

We must now begin to realize, and the Chicago convention will doubtless open the eyes of many to the necessity of this situation, that the amount of money expended in highway building must be doubled and trebled. Our highways must be wider, more solid, more permanent; built to stand any amount of traffic, for the traffic today by automobiles, motorbuses and motortrucks is small as compared with the traffic of the next few years.

This country is growing with such amazing rapidity, increasing its population at the rate of 2,000,000 a year, developing its industrial and business affairs of all kinds far more rapidly than its population is increasing, that we must plan great things for the future.

It is true that there is much talk of increased taxation. Perhaps some remedy for this must be

found. But it will not be found by lessened highway building. Indeed, the tax on gasoline makes it possible to build highways without a dollar of cost to the public, or without a dollar of additional taxation. The user of the highway actually saves money by paying a gasoline tax. This has been so completely demonstrated that argument on that point is no longer necessary. It is well, therefore, that the leaders in this great industry, men of engineering skill, men who are profoundly studying the problems of transportation, men who are catching a glimpse of what road building in the future must be, should meet in a great convention to be held next week in Chicago and there study every phase of road building. The attrition of mind against mind will bring new ideas to the front, new plans will be developed, new methods of highway construction will be studied; and out of these annual conventions will radiate an influence for the good of the whole country.

The highway builder, whether he be the engineer, the contractor or the day laborer on the job, is to the extent of his work and influence rendering a great service to humanity.—Manufacturers Record.

On sharp curves on the highways nowadays the road department places fences about four feet high. These are referred to as "sliding fences." When a car takes a notion to leave the road on a curve it strikes the fence and slides along until it can be stopped.—Times-Union.

AMENDED VERSION

Show me a paved road home,
I'm tired and I want to go to bed.
I just drove to town 'bout an hour ago,
In mud clear to my head.

Everywhere I roam,
Through sand and mud and loam,
You'll always hear me singing this song,
Build me a paved road home.

—Nation's Highways.

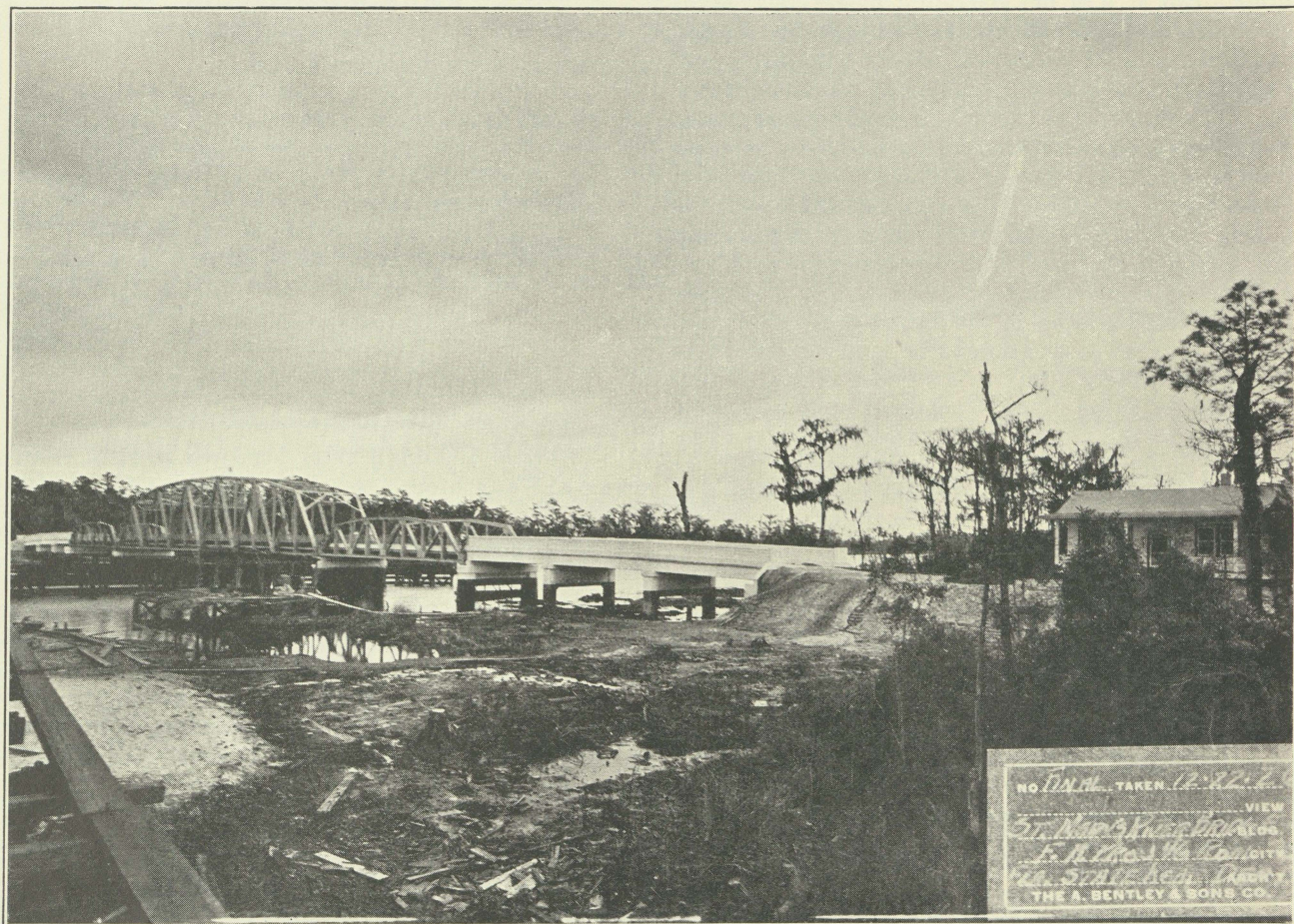
FLORIDA CONSTRUCTION

Florida is making greater headway in road building than any other state in the Union. And these roads are linking towns and cities together in a manner that reflects great credit on the state.

Governor Martin in his campaign pledged the people that his administration would see hundreds of miles of the best highways in this country, and the people knew this would be done. When he selected Fons A. Hathaway as the head of the road department, he selected beyond question the most capable man in the state for this work. All Florida agrees that Dr. Hathaway is doing far more than even his friends expected. Thousands who drive over the highways of Florida commend the achievements in eulogistic terms.—The Floridian.



St. Mary's River Bridge On Road No. 3 North of Jacksonville. F. A. Project No. 421



St. Mary's River Bridge On Road No. 3 North of Jacksonville. F. A. Project No. 421

MIAMI OFFERS PRIZES FOR BOULEVARD DESIGN

Biscayne boulevard, Miami, Florida, along the waterfront for three and one-half miles, will be a new Fifth avenue with a touch of the Riviera, commanding scenic views of charming Biscayne Bay, its islands and shipping and Bay Front Park on the one hand, and the city's show buildings on the other.

The new Biscayne boulevard will be part of the Dixie Highway. It will afford a world pattern for what can be achieved with a unified scheme of street architecture.

Prizes amounting to \$4,650 have been offered by the boulevard association. One thousand dollars will be awarded for the best design for observation towers and traffic signal standards, with a \$600 second prize.

Another competition relates to designs for filling stations, which must have no open-air greasing room and which must have an office, two lavatories and two driveways, each with capacity for four cars. Prizes will be \$700 and \$400.

This is believed to be the first step ever taken to confine the filling stations along an entire street to a plan of architectural harmony.

A vast surgical operation was necessary to create the new boulevard. The south end, formerly Bay Shore drive, was widened and improved. No less than 14 city blocks and 19 improved residential blocks were cut through in making the north two and one-half miles of the street.—Michigan Roads and Pavements.

SUPER-HIGHWAY TO RUN FROM COAST TO COAST

Senator du Pont (Rep.) of Delaware, has just introduced a bill which would authorize a survey of a super-highway from the Atlantic to the Pacific Coasts, the highway to be constructed by a federal corporation to be created for that purpose.

The bill provides that the route of the proposed highway shall be as direct as practicable and that no part of it shall be located within any municipality having a population of 2,500 or more. There would be facilities for two-way fast traffic and separate arteries for two-way truck and heavy traffic.

The bill would provide for a right-of-way of not less than 500 feet and the corporation would be authorized to lease the unused portion of the right-of-way until needed for road purposes. Senator du Pont estimates that the rentals from these leases will pay the upkeep and operating costs of the highway and eventually provide a balance to be deposited in the treasury of the United States to repay the cost of construction, and ultimately to be a source of income to the United States and the states.

Under the bill provision is made for tourist camps, the establishment and operation of emergency airplane landing fields, radio and other electrical communication facilities for air navigation approved by the secretary of commerce, subject to the requirements of the air commerce act of 1926.

Authority would be granted by the bill to construct, operate, and maintain any part of the highway within the borders of any state by or through the state highway department, state highway commission or other proper state officials.—Louisiana Highway Magazine.

TWO THOUSAND YEARS OF ROAD BUILDING

(Continued from page 3)

ment and widths of highways leading from the large population center of Milan, that about 50 miles of toll motor roads have been built under Governmental franchise by private corporations.

France and Belgium have a wonderful heritage in the systematic plan that was laid out and begun prior to, and developed and completed since, the Napoleonic Decree of 1811, so that the layout and classification of the highway systems in these countries on a nation-wide basis for uniformity and adequacy of planning are perhaps superior to anything in any like area. The Polytechnic School and the Ecole des Ponts et Chaussées supply the highest ranking engineering graduates for the highway work. In both these countries there is a considerable mileage of main routes paved with stone blocks but the surfacing problem on long mileages of macadam is important. A series of experimental roads have been built near Paris for testing various types of concrete slab and bituminous construction, as well as surface treatments.

In Austria and in Czechoslovakia also the surfacing problem on the main roads is of first importance. There are in existence some splendid highways which we are informed date back to the time of Marie Therese. Near Vienna and again near Prague experimental roads are under construction in which both the bituminous mixed types and concrete slabs have been made. These appear to be the first roadways which have been laid in these countries corresponding to the standard types of pavement in general use here. We were informed that following establishment of a school for technical instruction in France, a school was established in Prague, and whether from this school emanated the standards that were set up for the national road construction is not made clear, but in any event some of the best roads, those more nearly corresponding to the best modern standards in alignment, substantial proportions, width and adequacy, are found near Prague. Where such roads existed an adequate modern surface will complete roads of the highest class.

In Germany the road work has been carried on by the individual States rather than through any central direction, so that the highway service now is on a State rather than a national basis. The Federal Director of Traffic states that the major problem is to provide national routes. An experimental track, similar to that used in the Pittsburgh and Arlington tests, has been built by one of the States for testing the relative values of the various types of construction that may be used.

In Great Britain, with an area of 50,000 square miles and a population of 37,000,000 people, the traffic problem has become acute within and between the big cities. The Ministry of Transport has built some arterial roads to relieve bottle necks and to establish through lines of communication. Where these have been completed as parts of established routes they are carrying a very heavy traffic and have afforded wonderful relief. This work, however, was taken up at the particular time to assist in providing employment, and a part, at least, did not accord with the views of the Ministry of Transport. Where entirely new roads have been opened,

width of roadway, alignment and engineering features show splendid vision in providing for the future. But in order to make them fully effective much more work and further expenditures are necessary and this is the difficult problem.

The feature of the work here which deserves the closest attention on the part of the engineers of this country is the new roads which are being laid out to by-pass the congested streets of villages and towns. A typical illustration of the fact that human nature is very much the same the world over, is the record of the fight made by one of the towns established possibly during the time of William the Conqueror to prevent a by-pass being constructed around the town to take the traffic out of the narrow crooked streets of a very densely populated district. The problem of new bridges over the Thames and opening of new traffic ways in London County present problems of first magnitude which the Ministry of Transport is now courageously attacking. It is difficult for us to realize in this country the obstacles imposed by the tremendous weight attached to personal and property rights in Great Britain. To illustrate: Because in the olden days the city of London collected customs at its gates, farmers having supplies to sell formed the habit of stopping just outside the gate and the people came out from the city to buy. So gradually there was established a market. At the Aldgate a hay market was established. As the population settled and as villages grew up all around the city of London, which itself is just one mile square, the hay market still persisted and today one of the main traffic arteries to the docks and warehouses now runs through this old market. On certain days of the week the hay carts are parked from curb to curb leaving only room for passage of the street cars in the center. It is doubtful if any area in this country presents as complex and difficult problems as the London County area in the immediate vicinity of the city of London, many of which emanate from ancient rights, customs and traditions. The country roads are largely of macadam construction, surface oiled. They fit into the English countryside and offer most delightful recreational opportunities but they can not supply the facilities necessary to heavy traffic arteries.

In Sweden experimental roads of different types have been built near Stockholm and a very active debate is taking place as to the best types of road construction. But the real problem at present is to re-align, widen and grade the old roads to offer proper facilities for motor traffic.

In Amsterdam, as would be expected, the foundation problem is very important, but high technical skill has been exhibited in the construction of roadways. Some of the best asphalt pavements in Europe are in this city.

Denmark is supplied with an arterial road system with ample right of way and a large mileage of stone block pavements. There are also experimental stretches of road near Copenhagen and there is a departure from the usual type of such roads in that parallel lanes of different materials have been built and the traffic is divided between the pneumatic, solid rubber and steel tired vehicles, each taking the lane provided for that particular type. One of the notable types of traffic here is the bicycle. In a



Project 672—Road No. 1, Leon County, West of Tallahassee

population of 3,289,183, we are told there are one and one-quarter millions of bicycles, and apparently most of these are on the road at the same time.

CONTRAST WITH THE UNITED STATES

Considering the rural highways there are two outstanding contrasts between the United States and the countries here touched upon, the character and extent of highway traffic and the highway finances. The motor passenger car is regarded still, as in an earlier time in the United States, as a luxury and treated as such, and so it is a luxury. The prices of new cars are high, though there is a very rapidly growing production of lower priced types. Motor fuel is high. Annual taxes are high. Consequently the development of the use of passenger cars in any of these countries can not be remotely compared with the use in the United States. Driving over the national roads of France for example, once outside the immediate influence of a large city the motor traffic is so small, in fact all traffic is so limited, that it is evident there is a very different kind of life prevailing in the rural communities than that which exists here. While there is much very short radius motor traffic in the large cities, the people generally have not discovered the potentialities of motor transportation either for business or recreation. They have not yet found the way to know their own countryside, their country's scenic attractions or the commercial advantages of fast, convenient transportation. From a limited viewpoint, conditions appear very much as they did in this country ten or fifteen

years ago, just before the avalanche of motor vehicles enveloped us. A similar turning to the use of motor vehicles will come but probably it will be somewhat reversed. Our private motors came first and the public later. Possibly in Europe the public motor vehicle may develop first in a large way, both busses and commercial haulers, to be followed by a large use of the private motor.

FINANCIAL ASPECTS

Everywhere the highway officials are laboring under the severe handicap of lack of funds. When it is remembered how many of the European countries finance the entire cost of the national highways, it is easily understood, with the national treasuries and currencies in their present conditions, what great difficulties stand in the way of renewing and rebuilding their highways to modern standards. It is undoubtedly this situation that has turned Italy toward a favorable consideration of the motor toll road, privately owned.

In view of the demonstrated capacity of improved highways to stimulate commerce and to make possible new lines of profitable production, it came as a shock when we were informed that a bond issue for much needed rehabilitation of important highways in one country had been forbidden because such expenditures are not capable of producing a direct return—proof unanswerable that in high places modern highway transport is believed a luxury and not a commercial necessity.

Simple but important conclusions shape themselves

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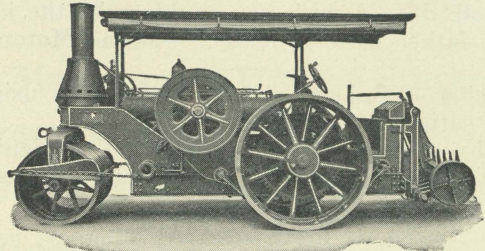
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with the present day highway conditions of Europe projected against the background of the highway history of the two thousand years since the beginning of the Appian Way, a section of which may be seen today crossing the Campagna, toward the Alban hills, preserved as an interesting and valuable historical record; but the traffic is carried over another highway and itself has about the same relationship to modern road building as the skeleton outlines of the cliff dwellings in our West have to modern architecture. The likeness to the original is about the same in each.

Highways are a thing of service. Service requires changes; they must themselves change; and to provide adequate service over the largest possible mileage and at the least cost is the requirement just now, and there is abundant evidence that this has always been the policy when efficient highway service was required over a large area.

This building up under service, only another name for stage construction, has always prevailed. Our roads must be maintained and strengthened, certainly and constantly, but this has always been the case. Referring again to the Appian Way, we have the record of its being repaired and rebuilt for at least 500 years although the first section was, we read, so expensively built as to wreck the Roman treasury. History asserts loudly the fact that once he has set traffic going over a highway, the work of the engineer has just begun.

As to standards of construction, there again is fixed only the one unflinching measure, that of ade-

quate, satisfactory service at minimum annual cost. No more, no less, is necessary.

On the other hand, what tremendous support history supplies for correct principles of administration. France and other countries which for a long time, from 100 to 150 years, have had an adequately planned national system with the roads classified in accord with their importance and with a highly qualified technical corps to carry into execution the administrative principles, have today a heritage of untold value. Their national roads have right of way widths, alignment, gradients, compacted road beds and fine bridges. They lack in many sections top surfacing suitable for heavy motor traffic which will be supplied as it becomes possible. This great heritage for future generations is not a product of extraordinary expenditures but rather the accumulated result of years of consistently following out right principles of administration.

France is not large—about 200,000 square miles—as compared to the United States—about 3,000,000 square miles, and in this great national area we are attempting to secure through co-operation between the States and the Federal Government under the Federal Highway legislation, national routes of high standards. The progress has been such that the eyes of the road builders of the older countries are now turned this way and the methods and results here will exert a profound influence in other nations. This is voiced in no vain or boasting spirit. Rather it is only to build any further protection possible that will guard against any breakdown of the spirit of

co-operation between the States and the Federal Government.

This would bring disaster to the completion of a national system of highways. No one can study the rise and fall of highway progress through the years or observe the existing evidence without being forced to this conclusion.—American Highways.

A Dirty Dig

"I wish you could make the kind of bread my mother used to make."

"Well, dear, I wish you could make the kind of dough father used to make."—Maine Motorist.

Teacher—"Robert, give me a sentence using the word 'sate'."

Bobby—"I took Mamie Jones to a picnic last summer and I'll sate."—Kentucky Highways.

'Twas Ever Thus

When the plumber makes a mistake he charges twice for it.

When a lawyer makes a mistake it is just what he wanted, because he has a chance to try the case all over again.

When a carpenter makes a mistake it's just what he expected.

When a doctor makes a mistake he buries it.

When a judge makes a mistake it becomes the law of the land.

When a preacher makes a mistake nobody knows the difference.

But when an editor makes a mistake—Good night! —Keystone Topics.

Finishing the Job

"How's this?" asked the lawyer. "You've named six bankers in your will to be pall bearers. Of course, it's all right, but wouldn't you rather choose some friends with whom you are on better terms?"

"No, judge, that's all right. Those fellows have carried me along; they might as well finish the job." —Todd Red and White.

It is going to be pretty hard for such Republican editors, if any, as are affected by it to be properly mad at the Democrats if they reduce taxes.—Ohio State Journal.

Progressive Pinching

A woman gave her young son half a dollar to buy a pound of plums, saying: "Be sure, Tommy, to pinch one or two of them to see if they are ripe."

In a few moments Tommy returned with both the fruit and the half dollar.

"I pinched one, as you told me," he explained, "and then when the man wasn't looking I pinched the whole bag full."—Progressive Grocer.

Couldn't Shake Each Other

He was a stranger in the neighborhood, and had been brought to a dance at the local deaf-and-dumb hospital by an old friend, the doctor.

"How on earth can I ask a deaf-and-dumb girl to dance?" he asked, a trifle anxiously.

"Just smile and bow to her," replied the doctor.

So the young man picked out a pretty girl and bowed and smiled, and she bowed and smiled, and away they danced.

They danced not only one dance that evening, but three, and he was on the point of asking her for another when a strange man approached his partner and said soulfully:

"I say, darling, when are we going to have another dance? It's almost an hour since I had one with you."

"I know, dear," answered the girl, "but I don't know how to get away from this deaf-and-dumb fellow!"—Tid-Bits.

Ouch!

They had been having a little quarrel and she turned to him with tears in her eyes.

"Well, John, even though I have been extravagant, I got a bargain today."

"Yes, I'll bet it was a bargain! You have no idea of the value of money. I suppose you got something for nothing."

"Well, I got a birthday present for you."—The Continent.

In Days of Old

When Noah sailed the ocean blue
He had his troubles same as you;
For days and days he drove the ark
Before he found a place to park.

—Azuride.

Contracts Awarded by State Road Department January 1st, 1927 to January 17th, 1927

Contractor	Project No.	County	Length Miles	Length Feet	Contract Plus 10%	Type
Noonan-Lawrence	54	Leon	13.00	....	\$ 385,297.67	Concrete
Noonan-Lawrence	54	Leon-Jefferson	9.10	....	266,053.37	Concrete
Duval Engr. & Contr. Co.	54-A & 59	Leon-Jefferson	12.53	....	264,524.48	R. B. S. T
Manley Constr. Co.	53-A	Lake	7.10	....	249,034.28	Asph. Conc.
W. J. Bryson Paving Co.	52	Escambia	10.089	....	241,904.49	C. G. & G.
Boone & Wester	677-C	Levy	10.16	....	224,345.88	C. G. & G.
Thompson & Moseley, Inc.	677-D	Levy	7.58	....	66,017.34	C. G. & G.
Lake Worth Const. Co.	683-C	Palm Beach	8.27	....	44,290.95	C. G. & G.
B. Booth & Co.	687-B	Lake	15.22	....	89,496.93	C. G. & G.
C. T. Dawkins	50-A	Putnam	....	120	22,243.32	Conc. Overhead
Okeechobee Const. Co.	655-667	Highlands	....	815	50,006.45	Timber
C. H. Turner Co.	697	Escambia	488	22,911.53	Timber
			95.049	1423	\$1,926,126.69	

Jack Camp, E. F. Fitch, Clarence Camp,
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Products of a modern, electrically
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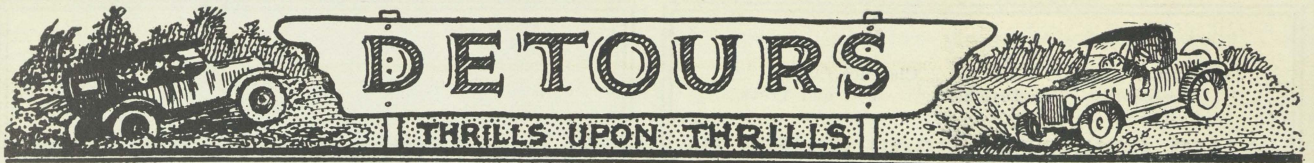
An Investment
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Transportation Equipment

**DURABLE
LOW-COST
DEPENDABLE**

**International Harvester Co.
OF AMERICA**

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Jacksonville, Fla.



Job for a Good Samaritan

A live-wire salesman rushed up to the home of a doctor in a small village about 3:00 A. M. and asked him to come at once to a distant town.

The doctor cranked his flivver and they drove furiously to their destination.

Upon their arrival the salesman asked, "How much is your fee, doctor?"

"Three dollars," said the physician, in surprise.

"Here you are," said the salesman, handing over the money, "the blamed garage keeper wanted \$15 to drive me over when I missed the train."—Key-stone Motorist.

Good Roads Item

"Wagner-St. Luke's—Owing to the condition of the roads in this locality, our regular weekly worship of Almighty God has been discontinued."—South Dakota Churchman.

Again the Fastidious

Diner—"I want some raw oysters. They must not be too large or too small; not too salty and not too soft. They must be cold and I'm in a hurry for them."

Waiter—"Yes, sir. Will you have them with or without pearls, sir."—Black and Blue Jay.

Very Simple

Little Girl (to grandfather): "Grandpa, why don't you grow hair on your head?"

Grandpa: "Well, why don't grass grow on a busy street?"

Little Girl: "Oh, I see; it can't get up through the concrete."—Georgia Highways.

Signs of the Times

The following signs have been observed on the rear of certain cars in Washington and other cities:

A Tin You Love to Touch.

Don't Laugh at Me; You May Be Old Yourself Some Day.

Mah-Junk.

The Covered Wagon.

Four Wheels. All tired.

Four Wheels and No Brakes.

Sick Cylinders.

Oil by Myself.

One Hundred Per Cent a Merry Can. 99 Per Cent Static.

Danger! 20,000 Jolts.

Don't Push Me Big Boy.

Little Bo-Peep.

Pray As You Enter.

Keep Off; My Rear End Is No Bumper.

—Pathfinder.

A pedestrian has rights—yes. But too often they are only the last sad rites.—Tampa Tribune.

Judicial Prerogative

McGuinness had been posted to keep guard over the entrance to a road which led to an old and unsafe bridge. Presently a car came along and he held up his hand.

"What's the matter?" growled the driver.

At that moment McGuinness recognized him as the county magistrate.

"Oh, it's yourself, Yer Honor," he said genially.

"Yes, it is!" was the snappy answer.

"'Tis all right, then," said Mac, as he stepped politely out of the way. "I got orders to let no traffic through because of the rotten bridge, but seein' it's you, Yer Honor, 'tis a pleasure—go right ahead, sir!"—American Legion Weekly.

Why Uncle Changed His Will

"Uncle Robert, when does your football team play?"

"Football team? What do you mean, my boy?"

"Why, I heard father say that when you kicked off we'd be able to afford a big automobile."—Boston Transcript.

Down and Out

Jeffrey—"So your son has been injured and is coming home from college?"

Briggs—"Yes, he sprained his ukulele finger."—Detroit News.

Postponement Pays

Sparks—"If you know who stole your car, why don't you get it back?"

Larks—"I'm waiting for him to paint it."—Life.

Our automobile figures run into millions, and so, apparently, do our automobiles.—American Lumberman.

Safe and Sound

Stop and let the train go by,

It hardly takes a minute;

Your car starts off again intact,

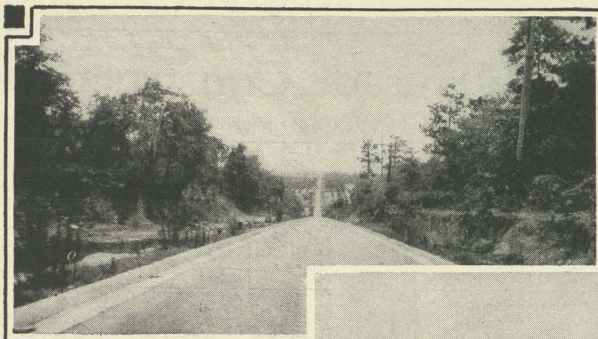
And better still—you're in it.

—Boston Transcript.

Sunny Side of an Eon

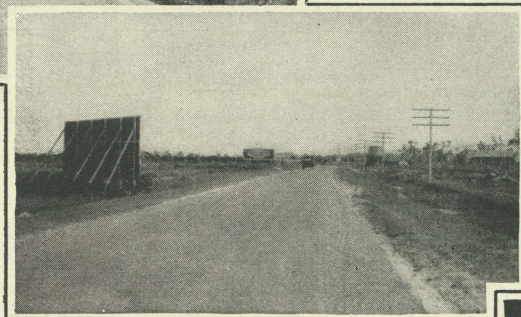
The bones of a woman presumably a million years old have been found in Asia. But you'll never get her to admit she is a day over a hundred thousand.—Life.

In various tourist guides over the nation most of Florida's roads are reported at "good; excellent." Florida has made remarkable progress in road building the past ten years, and it is likely that in ten more years the state will be entirely networked with excellent paved highways.—Times-Union.



State Road No. 23, Pasco County (inverted penetration Slag Macadam) just south of Dade City on Jacksonville-Tampa highway. Over 60% of total distance Jacksonville to Tampa is Bituminous Slag Macadam.

16½ miles type B paving in Alachua County, Waldo-Gainesville Road on main Jacksonville-Tampa highway; laid 1923.



Nearly Four Million sq. yds. of Bituminous

"ENSLEY" & "ALA CITY"
BASIC SLAG
CRUSHED & SCREENED

Macadam roads and streets laid in Florida during 1922-23-24-25-26 by the

Finley Method Co. (Jacksonville)

3,982,801 Square Yards of Bituminous Slag Macadam

County	Sq. Yds.
1. Alachua County Highways...	369,588
2. Brevard County Highways...	296,778
3. Citrus County Highways...	208,288
4. Hernando County Highways..	389,000
5. Hillsborough Co. Highways..	40,000
6. Lake County Highways.....	139,180
7. Manatee County Highways...	449,417
8. Orange County Highways....	170,533
9. Pasco County Highways.....	729,216
10. Polk County Highways.....	291,750
11. Sarasota County Highways...	18,750
12. Seminole County Highways..	263,792
13. Sumter County Highways....	393,259
14. St. John County Highways...	12,500
15. Volusia County Highways....	210,750

Grand Total3,982,801

A careful check up of Florida's superb system of hard surface highways will show a total of more than 800 miles of this one type—Bituminous Slag Macadam.

Asphalt and Slag surface treatment—on an Ocala Lime Rock base! The one type of hard surface highway Florida has found most serviceable and—least expensive.

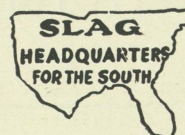
Each year the State Road Department of Florida uses "Ensley Basic Slag" in surface treating a round million square yards of main highways. Each year city, county and state projects totalling better than two million square yards are completed by contractors. A roster of the "slag built" roads in Florida is very nearly a complete roster of her principal highways.

BIRMINGHAM SLAG CO.

Atlanta
Thomasville

BIRMINGHAM
Montgomery

Jacksonville
Ocala, Fla.



Status of Construction

Through November 30th, 1926.

Proj. No.	Contractor	Road No.	County	Total Length Miles	Clearing Miles	Grading Miles	Base Miles	Surface Miles	Type	Per Cent Complete
7	Duval Engr. & Contr. Co.	2	Hamilton	13.00	.....	.....	9.40	6.50	S.T.	65.08
31	Duval Engr. & Contr. Co.	2	Hamilton	11.82	.....	.....	11.82	11.82	S.T.	100.00
41	Morgan-Hill Paving Co.	4	Dade	12.00	12.00	11.64	11.17	.59	S.A.	80.00
48	A. J. Hoffman	4	St. Johns	15.94	15.94	14.34	.....	.....	G.	92.00
49	A. J. Hoffman	4	Flagler	13.81	13.12	3.45	.....	.....	G.	51.00
50-A	Boone & Wester	14	Putnam	6.18	0.00	0.00	.....	.....	G.	0.00
50-B	B. Booth & Co.	14	Putnam	9.77	9.77	8.00	.....	.....	G.	75.00
50-C	E. Roy James	14	Putnam	10.03	6.02	3.01	.....	.....	G.	31.00
53-A	B. Booth & Co.	2	Lake	7.11	6.40	6.61	.....	.....	G.	80.60
53-C	Tampa Sand & Shell Co.	2	Lake	1.87	0.00	0.00	.....	.....	G.	0.00
500-A	Noonan-Lawrence	20	Bay	9.65	9.65	6.69	.....	4.00	Conc.	40.00
504	Duval Engr. & Contr. Co.	1	Columbia	9.41	.....	.....	7.50	5.64	S.T.	75.00
514	State Convict Forces	1	Jackson	11.04	8.83	8.17	.....	2.76	S.C.	53.90
529	M. C. Winterburn, Inc.	1	Suwannee	12.70	.....	.....	.....	.25	Conc.	3.00
533	Baker & Foulks, Inc.	1	Suwannee	13.47	.....	.....	4.74	0.00	S.T.	32.60
543	Lake Worth Constr. Co.	3	Seminole	14.20	12.07	8.50	.....	.....	G.	54.00
564-C	E. F. Powers Const. Co.	5	Charlotte	3.94	3.94	3.27	.....	.....	G.	89.00
564-B	Broadbent Const. Co.	5	Charlotte	9.73	.....	.....	7.00	0.00	S.T.	67.00
565	Johnson, Drake & Piper	1	Madison	15.99	.....	.....	.....	4.15	Conc.	26.90
580	State Convict Forces	19	Dixie	13.00	Under construction		.....	.....	S.T.	*
589	H. E. Wolfe	5	Lee	8.16	.....	.....	8.16	0.00	S.T.	91.00
590	State Convict Forces	1	Santa Rosa	9.00	Under construction		.....	.....	G.	*
592	Bennett Constr. Co.	10	Franklin	7.89	.79	0.00	.....	.....	G.	1.60
595	L. M. Gray	3	Volusia	6.43	.....	.....	6.43	3.21	S.T.	96.00
614	Walter J. Bryson Pav. Co.	5	Sarasota	17.07	17.07	7.42	.....	.....	G.	64.00
617 & 618	L. M. Gray	5	Alachua	16.07	.....	.....	15.80	12.00	S.T.	90.00
619	J. L. Gladwell	5	Alachua	9.28	6.49	1.39	.....	.....	G.	16.50
621	Penton-Mathis Const. Co.	1	Okaloosa	17.35	17.35	16.48	.....	.....	G.	95.60
623	State Convict Forces	35	Madison	12.91	12.91	12.26	.....	0.00	S.C.	71.80
631	E. P. Toulmin	1	Washington	8.53	8.53	8.25	.....	.....	G.	98.00
634	State Convict Forces	1	Jackson	11.07	11.07	11.07	.....	11.00	S.C.	96.00
641-A	Chas. F. Wilmore	4	Palm Beach	11.36	9.35	7.38	.....	.....	G.	65.60
642	F. S. Whitney	3	Putnam	10.82	.....	.....	10.82	10.82	S.T.	100.00
648	Southern Surety Co.	2	Hardee	14.17	14.17	14.00	.....	.....	G.	95.00
651	State Convict Forces	10	Gulf	14.72	13.98	11.04	.....	1.00	S.C.	39.00
655 (Sec. 2)	H. E. Wolfe	18	Highlands	1.74	1.74	1.74	1.44	.60	S.T.	97.00
657	State Convict Forces	6	Jackson	10.00	10.00	9.50	.....	9.00	S.C.	90.00
658	Myers Const. Co.	1	Holmes	8.21	8.21	8.21	.....	.....	G.	100.00
659	M. C. Winterburn, Inc.	3	Clay	13.27	5.97	0.00	.....	.....	G.	14.00
660	B. Booth & Co.	3	Clay	10.52	10.52	10.52	.....	.....	G.	100.00
660	Langston Const. Co.	3	Clay	10.52	.....	.....	.74	0.00	S.T.	6.00
663	Wm. P. McDonald Const. Co.	5	Citrus	8.03	.....	.....	6.24	0.00	S.T.	77.79
666	State Convict Forces	6	Jackson	6.52	6.52	6.52	.....	6.52	S.C.	100.00
667	H. E. Wolfe	18	DeSoto	8.63	8.19	5.18	1.21	0.00	S.T.	64.00
668	E. F. Powers Const. Co.	4	Brevard	13.45	11.29	3.69	.....	.....	G.	37.00
669-B	M. C. Winterburn, Inc.	27	Dade	10.32	10.32	10.32	10.32	8.00	S.T.	95.00
669-C	R. C. Huffman Const. Co.	27	Dade	12.00	4.50	.72	.....	.....	G.	6.00
669-V	Alexander, Ramsey & Kerr	27	Collier	11.91	9.00	5.03	.....	.....	G.	40.78
669-W	State Convict Forces	27	Collier	14.00	Under construction		.....	.....	S.T.	*
669-X	Alexander, Ramsey & Kerr	27	Collier	9.89	8.45	5.90	.....	.....	G.	60.00
670	State Convict Forces	6	Jackson	12.30	12.30	11.50	.....	11.00	S.C.	90.00
672	State Convict Forces	1	Leon	9.92	9.92	9.92	.....	9.82	S.C.	99.00
673	State Convict Forces	1	Gadsden	9.90	9.00	8.50	.....	7.50	S.A.	75.00
675	Wm. P. McDonald Const. Co.	17	Polk	5.16	5.16	5.16	4.95	1.29	S.A.	72.00
676-A	Gilbert & Hadsock	19	Levy	9.95	9.95	9.95	.....	.....	G.	100.00
676-B	McLeod Constr. Co.	19	Levy	14.89	12.81	12.23	.....	.....	G.	81.00
676-C	Langston Constr. Co.	19	Levy	13.93	13.51	3.00	.....	.....	G.	25.00
677-A	A. J. Hoffman	13	Levy	6.96	6.68	.35	.....	.....	G.	19.00
679	Wm. P. McDonald Const. Co.	5	Hernando	7.12	.....	.....	5.34	0.00	S.T.	75.00
682	L. B. McLeod Const. Co.	5	Citrus	6.46	.....	.....	6.33	0.00	S.T.	97.80
687-A	E. W. Ellis	2	Lake	15.00	11.70	7.50	.....	.....	G.	60.00
692	Boone & Wester	4	St. Lucie	7.38	.74	0.00	.....	.....	G.	.07
693	Boone & Wester	4	St. Lucie	8.73	8.73	7.86	.....	.....	G.	48.60
694	C. A. Steed & Sons	4	Martin	8.48	8.05	5.93	.....	.....	G.	70.00
699	State Convict Forces	19	Jefferson	7.71	Under construction		.....	.....	G.	*
Total complete November 30, 1926				1731.87	1748.93	748.89	1336.56			
Complete month of November				25.76	38.78	26.44	34.14			
Total complete October 31, 1926				1706.11	1710.15	722.45	1302.42			

TOTAL MILEAGE COMPLETE

	Concrete	Brick	B. C.	S. A.	B. M.	Asph. Block	S. T.	S. C.	Marl	Total
Complete to Oct. 31, 1926	117.22	17.15	10.74	71.15	89.07	23.20	531.00	468.15	45.86	1372.64
Complete Month of November	4.49	.....	.....	3.64	.....	.....	26.50	3.14	.....	37.77
Total to Nov. 30, 1926	121.71	17.15	10.74	74.79	89.07	23.20	557.50	471.29	45.86	1410.41

* Not reported.

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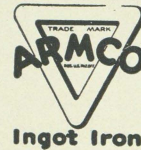
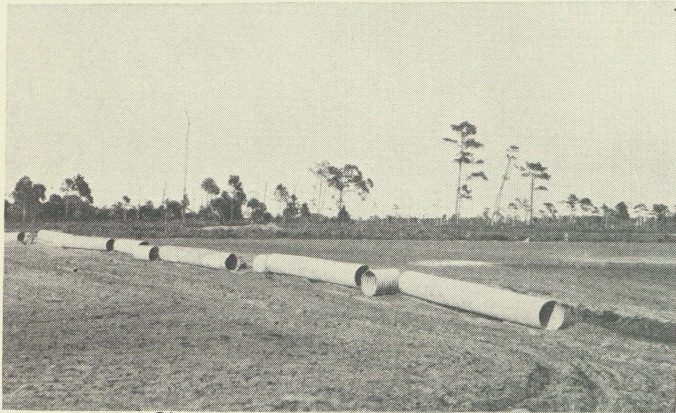
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